



Mathematica 9 has just been released — with many features that will appeal to OR professionals and Industrial engineers. Here are just a few:

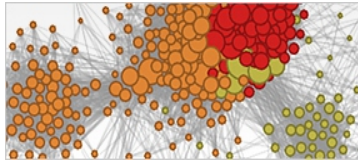


## Optimize your workflow with the Wolfram Predictive Interface

The Wolfram Predictive Interface makes it easy to find and use the power of Mathematica 9. The Input Assistant's context-sensitive autocompletion and dynamic highlighting help you discover and enter commands, and the next-computation Suggestions Bar offers optimized suggestions for what to do next.

## Social Network Analysis

Mathematica 9 introduces a full suite of social network analysis features including community detection, cohesive groups, and centrality measures, plus built-in links to Facebook, LinkedIn, Twitter, and more. It also adds new capabilities for network flows and new graph distributions.



## Use survival analysis and other expanded capabilities in data science and visualization

Mathematica offers more statistical distributions than any other system, including specialized coverage of finance, medicine, and engineering. Mathematica 9 adds survival and reliability analysis; full support for random processes including queues, time series, and stochastic differential equations; a complete set of customizable gauges for dashboards and reports; and systemwide support for automatic legends for plots and charts.

## Markov Chains and Queues

Automated support for discrete-time and continuous-time finite Markov processes and for finite and infinite queues and queueing networks. Compute performance measures and design processes for applications like call centers or server architecture.



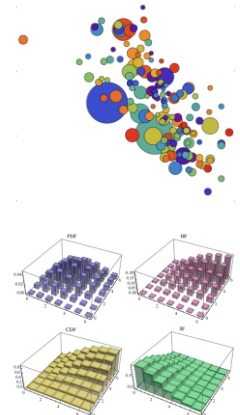
## Enhanced Graphs and Networks

New capabilities, including the ability to compute network flows, find graph cuts and partitions, and automatically visualize groups of vertices and bundle edges. Additional graph distributions, tours, and graph layouts extend a large collection of features. Performance improvements are available across the board.



## Enhanced Probability and Statistics

Expanded capabilities in probability and statistics, including dependency measures, new hypothesis tests, weighted data, and new derived distributions

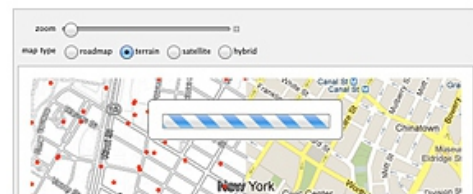


## Built-in Integration with R

Integrate R code into your Mathematica workflow, exchange data between Mathematica and R or even execute R code from within Mathematica.

## Full Range of Web Access Support

Full client-side web access for exchanging data with remote servers and interacting APIs

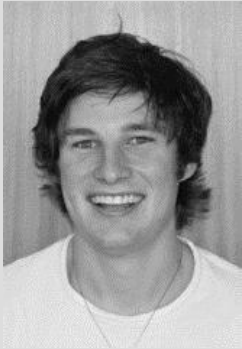


## Enterprise CDF Deployment

Instantly create documents in the Computable Document Format (CDF) to present interactive charts of results, show dynamic models, or prototype your next application, and deploy them to the web or desktop. With Mathematica Enterprise Edition, you can deploy CDFs with live data and other enhanced features.

## FROM THE EDITOR

Contactable at: [14854937@sun.ac.za](mailto:14854937@sun.ac.za)



**Mark Einhorn**

Hello and welcome to the final edition of the ORSSA Newsletter for 2012! How the year has flown past! It seems like just yesterday I was sitting down to write my first editorial column for the March edition of the Newsletter. I'm really proud of this December issue and feel it is the best

issue that I have been in charge of so far. So without any further ado, let's get into it!

This edition begins with a closing word from our President reflecting on the past year and looking forward to 2013. This is followed by the edition's feature article written by Francois Fagan, entitled "The Law of Modelling". Francois is a Masters student from Stellenbosch University, and won the award for the best presentation by a Masters student at the ORSSA Annual Conference this year. There is a second article included by Michael Trick, who is a previous president of INFORMS. The article addresses the much spoken about topic of incorporating the new buzz word "analytics" into Operations Research and is a very interesting read indeed! Instead of a single member interview, this edition contains a double interview with two honorary life members of the Society: Hans Ittmann and Theo Stewart. In the interview they share their thoughts on Michael Trick's article as well as their views on what role analytics can and should play in Operations Research here in South Africa. Finally, the Newsletter closes with a call for papers for next year's Annual Conference, together with all the important, relevant dates associated with it.

Well that's all from me for this year! I hope you have enjoyed reading the Newsletter as much as I have enjoyed editing it! I would like to take this opportunity to thank everyone who has helped along the way with the Newsletter this year and to wish all ORSSA members a safe, relaxing and enjoyable festive season! Until next year, cheers all, and enjoy the read! ☺

## Features

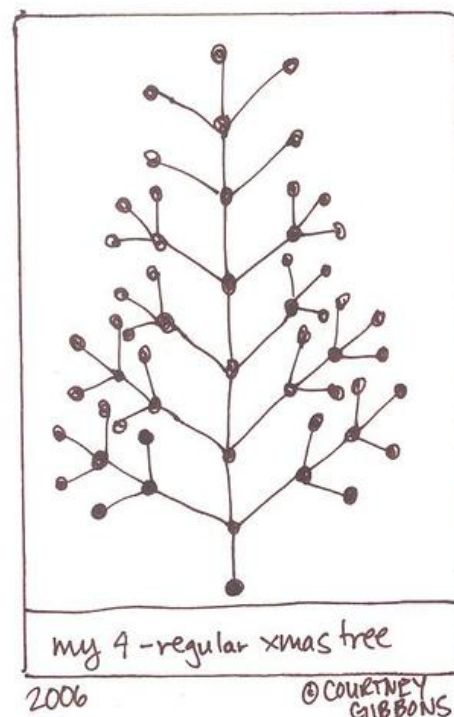
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## QUERIES AND CONTRIBUTIONS

Any queries and contributions to the newsletter are most welcome, especially article submissions. For any queries and contributions, please contact the newsletter editor: Mark Einhorn

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## FROM THE PRESIDENT'S DESK

by Jan van Vuuren ([vuuren@sun.ac.za](mailto:vuuren@sun.ac.za))

**ORSSA President**



**Jan van Vuuren**

As I sit down to write this column, I marvel at the impressive pace at which this year has almost careered to an end. At the end of a calendar year it is customary and perhaps natural to take stock of what has been achieved during the past twelve months and to plan ahead for the next twelve months.

Our chapters have been quite active this year:

- The Johannesburg Chapter hosted four events this year (three seminars by Michael Allschwang, Eric Soubeiga and Vince Micali, as well as an AGM).
- The Pretoria Chapter also hosted four events in 2012 (three seminars by Relita Pretorius, Joke Bührman, Colin Philips, Angela Rademeyer, Eric Soubeiga and Nadia Viljoen, as well as an AGM).
- The Vaal Triangle Chapter saw the co-option of a new chapter chairperson, Lieschen Venter, after the previous chairperson, Hennie Kruger, resigned following many years of excellent service in this capacity. The chapter hosted two events this year (a seminar by Roelof Coetzer and an AGM).
- The Western Cape Chapter hosted six events this year (four seminars by Paolo Toth, John Bartholdi, Theo Stewart, John Hearne, a workshop by Jason Matthews and an AGM).
- Remi Adewumi has launched a resurrected exercise of the Kwazulu-Natal Chapter during the months of October and November 2012, but more about this in the next Newsletter.

We enjoyed a very successful and truly enjoyable annual conference at Aloe Ridge this year, boasting a large number of varied papers and clearly showing that OR is alive and well in South Africa! The large numbers of student and industry delegates at the conference were particularly inspiring, as were the levels of achievement that we celebrated with the Tom Rozwadowski award, as well as a number of recognition and honorary life membership awards during the conference. There is probably no need to add that the social side of the conference programme was, of course, as enjoyable as we have become accustomed to at annual ORSSA conferences over the years!

The Executive Committee has introduced a number of exciting new initiatives this year as described in my previous column in the September issue of the Newsletter, including the introduction of:

- a new Marketing Manager portfolio on the Executive Committee,
- a fourth category of Recognition Award for a young operations researcher,
- medals for both categories of the student competition from 2013 onwards,
- planned sponsorship of student competition finalists to present their work at the conference,
- a new, exciting corporate membership package.

Judging by the above achievements and activities I would say that 2012 has been a good year for ORSSA. In my next column I would like to focus on what I see as the challenges for ORSSA in the immediate future.

I would like to thank most sincerely each member of the Society and of the Executive Committee who have helped to make 2012 a successful year for ORSSA, by helping to realize one or more of the above activities/achievements. The members are, of course, the lifeblood of our Society, and the unfailing commitment to ORSSA and sheer good will towards our profession that I have seen this year from a large number of ORSSA members have been both heartening and humbling. Thank you all for helping to make ORSSA an active professional home for Operations Research in South Africa!

A few people are leaving the national Executive Committee at the end of the year. They are:

- Marthi Harmse, who is stepping down as treasurer after four years of superb service to the Society in this capacity.
- Margarete Bester, who has resigned as chapter chairperson of the Western Cape Chapter after a period of 10 years of service to the Society!
- 'Maseka Lesaoana, who is stepping down as additional member of the Executive Committee after three years of service to the Society which she began by organizing the 2010 national conference in Polokwane.

To Marthi, Margarete and 'Maseka my sincere thanks for your passion and commitment to ORSSA. We know you will remain active members of our Society. Dave Evans has also completed his cycle as president of ORSSA (president during 2010-2011 and vice president



during the peripheral years 2009 and 2012). Fortunately Dave is not leaving the Executive Committee, but more about this in the next issue of the Newsletter. Dave, thank you for doing a sterling job as president and vice president over the last four years!

Finally, allow me the opportunity to wish each and every one of our members a safe, happy and peaceful festive season. I hope that you are able to enjoy quality time together with family and friends over the Christmas and New Year holiday period, and I trust that you will be able to rest adequately before the onset of the new year with all its challenges and opportunities that lie ahead.

## A TASTE OF EURO 2012

by Anton de Villiers (14812673@sun.ac.za)

### Department of Logistics, Stellenbosch University

The 25th European Conference on Operational Research was held from 8 – 11 July 2012 in Vilnius, Lithuania with the theme – *OR Connecting Sciences*. Situated in one of the most beautiful cities of the Baltic states, this conference consisted of 1918 presentations organised in 4 daily sessions, each spanning forty-five parallel streams, covering a truly diverse set of OR-related topics.

This international conference boasted more than 2100 participants from 68 countries – including 16 South African delegates.



A visit to Trakai Castle outside Vilnius during an excursion.

There were a set of twelve keynote and tutorial lectures and three invited speakers, all of whom delivered fascinating lectures:

- Prof Finn Kydland (Nobel Laureate in Economic Sciences), *Dynamic Programming and Economics*
- Prof Hans-Jurgen Zimmerman (RWTH Aachen), *40 Years of EURO: History, Applications, Future Potentials*
- Prof Ralph Gomory (New York University), *Forty Years of Corner Polyhedra*

A number of outstanding social events ensured an unforgettable experience. On the evening of the 9th of July, delegates were entertained at the Lithuanian National Opera and Ballet Theatre by a captivating modern ballet. The Gala dinner was held at the heart of the historic *Old Town* in Vilnius on the 10th and a pleasant Farewell party at the University of Vilnius on the 11th brought an end to an interesting, exciting and thoroughly enjoyable experience.

The 26th European Conference on Operational Research will be held in Rome, Italy from 1–4 July, 2013. It will be an event co-hosted by the European Association of Operational Research (EURO) and the Institute for Operations Research and the Management Sciences (INFORMS).



Prof Finn Kydland (Nobel Laureate in Economic Sciences) delivering his talk "Dynamic Programming and Economics"

# The Law of Modelling

by Francois Fagan (17161819@sun.ac.za)

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In the October edition of this newsletter, Jacques du Toit presented a serious analysis of the academic research presented in the 41st annual conference of ORSSA. The article concluded with a clouded vision of Operations Research, based on the frequency of words used in the abstracts of the annual conference held in Spetember 2012 at Aloe Ridge.

This cloud may be seen in Figure 1 on page 6. At the centre of this cloud was the term "model." In total, "model" appeared 80 times in the abstracts, more than double that of the next most used word, "network" (39 times). Thus, given its prevalence in operations research, the term "model" warrants an investigation into its meaning and usage.

The term "model" derives from the Latin "modulus", meaning "a small measure, standard" and entered into the English language in the sixteenth century, referring to objects with a "likeness made to scale; [an] architect's set of designs" (Online Etymological Dictionary, 2012). This type of model, now known as an "iconic model," is currently regarded as just one of three<sup>1</sup> categories of models (Sen, 2010 and Ackoff, 1962 according to Rivett, 1972).

Iconic models are defined to be a "miniature form of the image of a real phenomenon" (Sen, 2010) and include items such as: photographs, road maps, toy cars and globes of the earth. A fundamental property of an iconic model is that it represents a static event, in contrast to models which describe dynamic events, called "analogue models." Analogue models are typically diagrammatic, with demand curves, frequency distributions, organizational charts and flowcharts being prime examples. The final type of model is "symbolic" or "analytic." These are the mathematical abstraction(s) of iconic or analogue models and are represented by a set of equations. It is this sort of model which can be mathematically optimised, and hence forms the basis of operations research.

A fundamental question that must be addressed when employing models in operations research is whether

they are valid. Is the model true to the phenomenon it represents? What can be learnt from manipulating the model and optimizing it? Will the optimum solution of the model be practically feasible?

Philosophers have approached these questions through the eyes of semantics (how do models represent things?), ontology (what are models?) and epistemology (what can be learnt from models?) (Stanford Encyclopedia of Philosophy, *Models in science*, 2012). One of the main battlegrounds for analysing these issues is the philosophy of science.

At the crux of the philosophy of science are the terms: "hypothesis" and "theory." The Journal of Theoretics (Siepmann, 1999) offers the following definitions:

**hypothesis:** a tentative or working assumption which scientific study has yet to validate,

**theory:** a hypothesis or group of hypotheses which have been validated but not to the point of near certainty.

It is clear that both of these terms refer to kinds of models. The essential feature distinguishing hypotheses from theories is that of validation through experimentation. The underlying idea behind this is that the better a model agrees with experiment, the more true it is and the more accurately it may be used to predict or explain how phenomena occur. This notion is undermined by problems of epistemology, specifically that of truth in induction and accuracy.

Induction is the process of deriving general principles, or rules, from specific observations<sup>2</sup> and forms the basis of the scientific method. Unfortunately for science, induction can be misleading, as was shown to be the case in the famous example of black swans. Prior to 1697, a black swan had never been observed by anyone in Western civilization, hence many people believed that all swans were white and that there was no such thing as a black swan. However, a black swan was finally observed in western Australia in 1697 and the fallacy that black swans didn't exist was proven wrong (Black swans explained, 2012, which is the website of Tale,

<sup>1</sup> Many other types of models have been proposed (Stanford Encyclopedia of Philosophy, *Models in science*, 2012); but iconic, analogue and abstract models form the simplest categorization of models.

<sup>2</sup> This definition of induction is slightly outdated as probabilities, opposed to principles, are inferred by induction. For a detailed description refer to (Internet Encyclopedia of Philosophy, 2012).

2010). This example shows that it is impossible to prove a model to be true. However-many specific observations there were of white swans, the rule could not be proven that that all swans are white. This was mused upon by Geroch, who commented, "I don't even know what a 'proof' could mean in this context. I wouldn't recognize a 'proof of a physical theory' if I saw one" (Geroch, 1981).

An empirical model's validity is substantiated by drawing it on a graph and comparing it to the data. The smaller the error between the the model and the data points, the more accurate and, it is natural to assume, the better, the model is. Lagrange polynomials can be used to construct models in exact agreement with the data, therefore it should be straightforward to determine the best model for every data set! Yet Lagrange polynomials are virtually never used. The reason for this is attributed to Lagrange polynomials being guilty of the problem of overfitting – when a model describes random error or noise instead of the underlying relationship between the variables. This leads to the ironic situation that accurate models (*i.e.* those that accurately describe the underlying relationship) do not accurately fit data (*i.e.* agree with every data point). Of course, *ceteris paribus*, more accurate models are preferable, although accuracy is usually just one of a range of factors (*e.g.* simplicity, consilience and analogy (Thagard, 1978)) used in evaluating models.

Philosophers of science may conclude that the difference between a hypothesis, theory or any other scientific model is unclear. In each case it is impossible to determine whether they are true or even whether they are accurate approximations of the truth.

Model building in operations research is a different task to that in science. A quotation attributed to Howard Emmons elucidates that the challenge in mathematical modelling is "not to produce the most comprehensive descriptive model but to produce the simplest possible model that incorporates the major features of the phenomenon of interest." It is standard for models to simplify phenomena, only retaining their major features (such as using linear programming for non-linear problems), so that the models may be solved more easily. In this sense, models in operations research are not scientific theories since they ignore certain features of phenomena and therefore do not attempt to represent the truth. However, theories and laws (which are closely related to theories)<sup>3</sup> may also ignore certain

<sup>3</sup> Various distinctions have been made between laws and theories, although none of them are fully persuasive. A defining feature of a law is that it is universal with unlimited scope (Salmon, 1989, p. 13),

features (for example, Newton's Laws hold only in a flat space-time which is never the case in our universe). Thus, there is no apparent difference between models in operations research and scientific theories or laws, and there is no reason why the terms "theory" and "law" may not be used in naming such models.

Some disciplines have embraced the full scientific lexicon, such as economics, with: Buffer theory, Campbell's law, Calmfors-Driffill hypothesis, Efficient-market hypothesis, Iron law of prohibition and rational choice theory. Nobel laureate P.W. Anderson made the point (while arguing against reductionism) that every level of science should have its own theories and laws (Anderson, 1972), "At each stage, entirely new laws, concepts and generalizations are necessary, requiring inspiration and creativity to just as great a degree as in the previous one."

In a field as inspirational and creative as operations research, one would expect there to be theories and laws aplenty. Yet in Jacques du Toit's word cloud they are nowhere to be seen. In all of the abstracts, "theory" was used only once and "law" not at all. This is undoubtedly due to the innate modesty of operations researchers, content with using the word "model" instead of the more impressive and definitive sounding "theory" or "law." In practice this makes no difference, as "model" is a perfectly adequate term. But if you wish to write an extraordinary article which grabs the attention of the reader to the very end, make sure to put the word "law" into the title.

## References

- [1] Ackoff, R. L. (1962), *Scientific method: Optimizing applied research decisions*, John Wiley and Sons, New York.
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but there exist "theories of everything" which have these same qualities. Some argue that the difference between laws and theories is that they are descriptive and explanatory, respectively. However the nature of scientific explanations is still a contentious issue (Stanford Encyclopedia of Philosophy, *Scientific explanation*, 2012), with the historically most prominent method of scientific explanation being deductive-nomological ("nomological" deriving from "nomos," Greek for "law"). There is also the notion that theories are rudimentary ideas that may, if supported by sufficient evidence, graduate to become laws. By this account laws are more fundamental and better established than theories, yet the classical law of gravitation has, as its foundation, the general theory of relativity.

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<http://plato.stanford.edu/entries/scientific-explanation/> [Accessed: 13th November 2012].

[13] Tale N. N. (2010), *The black swan: The impact of the highly improbable*, Random House Publishing Group.

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Following the success of previous EURO Conferences, we announce the XXVI EURO- INFORMS Joint International Conference: "All roads lead to OR" which will be held in Rome on July 1-4, 2013.

**Important dates**

ABSTRACT SUBMISSION DEADLINE: **1 March 2013**

NOTIFICATION OF AUTHORS: **15 March 2013**

DEADLINE FOR AUTHORS REGISTRATION  
(for inclusion in the programme): **15 April 2013**



# Business Analytics and Operations Research: Tomato, To-mah-toe, Tractor!

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(<http://mat.tepper.cmu.edu/blog/>)

by Michael Trick

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**Dr Michael Trick**

Michael Trick is a researcher and educator in the field of operations research, with a specialization in computational methods in optimization. After receiving his doctorate in industrial engineering from Georgia Tech, Dr. Trick embarked on two years of postdoctoral fellowships, first at the Institute for Mathematics and its Applications in Minneapolis, then at the Institut fuer Oekonometrie und Operations Research in Bonn, Germany. He then joined the faculty of the Graduate School of Administration (now the Tepper School of Business) at Carnegie Mellon University. During the period 1998 - 2005, he was also President of the Carnegie Bosch Institute for Applied Studies in International Management, a research institute specializing in research support, conferences, and executive education on international management issues, and the incumbent of the Bosch Professorship during 2003 through 2005.

The students of GSIA awarded him the George Leland Bach Award as the top teacher in the program in 1991 and renominated him for that award in 1997, 1998 and 2000. In 1995, he was appointed the founding Editor of INFORMS Online, the electronic information service of the Institute for Operations Research and the Management Sciences, a 14 000 member professional society. In 2002 he was President of that society. Starting 2004, he became Vice-President (North America) of the International Federation of Operational Research Societies (IFORS), the umbrella organization of 46 national operations research societies. In 2007, Trick visited the University of Auckland as a Hood Fellow.

Trick is the author of forty professional publications and is the editor of five volumes of refereed articles. He has consulted extensively with the United States Postal Service on supply chain design, with Major League Baseball and a number of college basketball conferences on scheduling issues, and with companies such as Motorola and Sony on machine scheduling.

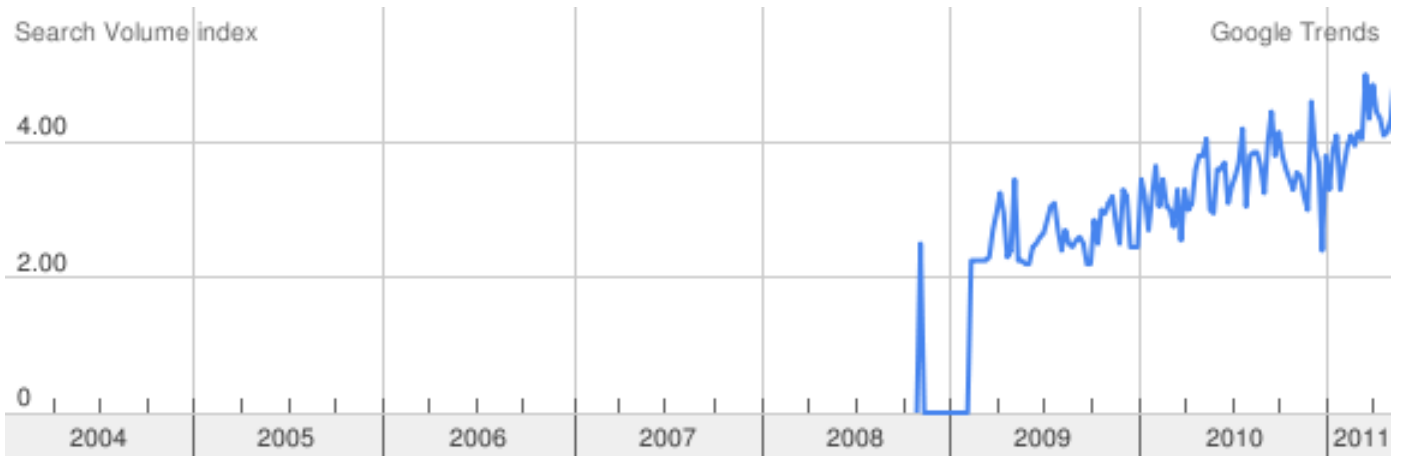
Trick is a Fellow of the Institute for Operations Research and the Management Sciences (INFORMS).

There are few things in life more tedious than assigning boundaries to fundamentally ill-defined concepts. Either terms are used to divide things that cannot be divided ("No, no, that is reddish-purple and clearly not purplish-red!") or are used to combine groups while ignoring any differences (Republicans? Democrats? just "Washington insiders"). Arguing over the terms is fundamentally unsatisfying: it rarely affects the underlying phenomena.

So when INFORMS, an organization of which I am proud to have been President and equally proud to be Fellow, embarks on its periodic nomenclature debate, ennui overwhelms. Not again! The initial debate between Operations Research and Management Science resulted in two societies (ORSA and TIMS) for forty years before they combined to form INFORMS in 1995. Decision Engineering, Management Engineering, Operations Engineering, Management Decision Making, Information Engineering, and countless other terms have been proposed at times, and some have even made toeholds in the form of academic department names or other usages. None of this has fundamentally changed our field, except perhaps in confusing possible collaborators and scaring off prospective members ("Wow, if they don't even know who they are then maybe I should check out a more with-it field!"). I decided long ago to just stick with "operations research" and make faces of disgust whenever anyone wanted to engage the issue of the name of the field.

Then, in 2008 (only! check the Google Trends graph in Figure 1) the phrase "business analytics" came along, and it was a miracle! Here was the phrase that really described what we were doing: using past data to predict the future and make better business decisions based on those predictions. That's us! And, due to books such as "Competing on Analytics", the wider world actually were interested in us! There were even popular books like "The Numerati" about us. We were finally popular!

Except it wasn't really about "us" in operations research. We are part of the business analytics story, but we are not the whole story, and I don't think we are a particularly big part of the story. A tremendous amount of what goes by the name "business analytics" are things like dashboards, business rules, text mining,



**Figure1: Google Trends graph showing the search volumes of the term "business analytics".**

predictive analytics, OLAP, and lots of other things that many “operations research” people don’t see as part of the field. IBM’s Watson is a great analytics story, but it is not fundamentally an operations research story. People in these areas of business analytics don’t see themselves as doing operations research.

Many of them don’t even identify with business analytics but rather with data mining, business intelligence, or other labels. All of this involves “using past data to help predict the future to make better decisions” but “operations research” doesn’t own that aspect of the world. There are lots of people out there who see this as their mandate but haven’t even heard of operations research, and really don’t care about that field.

This is not surprising for those with an INFORMS-centric point of view. INFORMS does not (and near as I can tell, ever has) represent even all of “operations research.” According to the Bureau of Labor Statistics, there are more than 65 000 people with the job “operations research analyst”. INFORMS membership of a bit more

than 10 000 is a small fraction of all those involved in operations research. INFORMS is not all of operations research: it certainly is a small amount of business analytics. How can INFORMS “own” business analytics when it doesn’t even own operations research?

Recognizing this divide does not mean erecting a wall between the areas (see the first paragraph on the mendacity of labels). I think the “business analytics” world has a tremendous amount to learn from the “operations research” world and vice versa. Here are few things the two groups should know (and are clearly known by some on both sides, though not to an ideal extent); I welcome your additions to these lists:

***What Business Analytics People should Learn from Operations Research***

1. Getting data and “understanding” it is not enough.
2. Predicting the future does not imply making better decisions.
3. Lots of decisions are interlinked in complicated ways.



**Figure2: Google Trends graph showing the comparison between search volumes of the term "business analytics" (bottom line) and "operations research" (top line).**

Simple rules are often not enough to reconcile those linkages.

4. Handling risk is more than knowing about the risk or even modeling the risk. See “stochastic optimization”.

5. Organizations have been competing on and changed by analytics for a long, long time now. See the Edelman competition to start.

6. Operations research is not exactly an obscure field. Check the google trends of “operations research” versus “business analytics” (see Figure 2).

### **What Operations Research People should Learn from Business Analytics**

1. It is not just the volume of data that is important: it is the velocity. There is new data every day/hour/minute/second, making the traditional OR approach of “get data, model, implement” hopelessly old-fashioned. Adapting in a sophisticated way to changing data is part of the implementation.

2. Not everything is complicated. Sometimes just getting great data and doing predictions followed by a simple decision model is enough to make better decisions. Not everything requires an integer program, let alone a stochastic mixed integer nonlinear optimization.

3. Models of data can involve more than means and variances, and even more than regression.

4. One project that really changes a company is worth a dozen papers (or perhaps 100) in the professional literature.

5. It is worthwhile for people to write about what is done in a way that real people can read it.

I believe strongly in both operations research and business analytics. I have spent my career advancing “operations research” and have never shied from that name. And I just led an effort to start an MBA-level track in business analytics at the Tepper School. This track includes operations research courses, but includes much more, including courses in data mining, probabilistic marketing models, information systems, and much more.

The lines between operations research and business analytics are undoubtedly blurred and further blurring is an admirable goal. The more the two worlds understand each other, the more we can learn from each other. INFORMS plays a tremendously important role in helping to blur the boundaries both by sharing the successes of the “operations research world” with the “business analytics” world, and by providing a conduit for information going the other way. And this, more than “owning” business analytics, is what INFORMS and its members should be doing.

Michael Trick may be contacted at [trick@cmu.edu](mailto:trick@cmu.edu)



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- <http://meetings2.informs.org/Analytics2013/>

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# Analytics and ORSSA: What Two of Our Honorary Life Members Think

Questions by Mark Einhorn

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In view of the current hype surrounding the term “analytics” in OR circles, I thought it only fitting to find out what two of the Society’s Honorary Life members thoughts on the topic were, as well as their views on the piece from Michael Trick on page 7. The members interviewed were Hans Ittmann (HI) and Theo Stewart (TS).

**What is your understanding of the term “analytics” which is being used more frequently in OR circles of late?**

**HI:** Analytics is a term that can be interpreted in various ways. Very simplistically it is “the science of analysis”. This is not helpful, since one then needs to define analysis. Here too different people have different views of what the word analysis means. From the ancient Greek word it means “breaking up”, “throughout” and “loosening” (from Wikipedia). When you analyse something you typically do break things down into smaller components in order to obtain a better understanding of what you are dealing with. There are also different types of analysis namely mathematical analysis, business analysis, system analysis, data analysis, statistical analysis, etc. For me “analytics” is a relatively new term which I first encountered when INFORMS, the American OR society, started publishing articles in OR/MS today that referred to Analytics and when they started using the term more and more. This goes back some 4 to 5 years ago before INFORMS really got onto the bandwagon. Analytics in essence means collecting and analysing data, and then using this to inform decisions which to my mind is not much different from OR! As I understand it, Analytics comprises statistical analysis, computer science (with the emphasis on data and data management) and operations research. Davenport and Harris in their book “Competing on Analytics” define it in very similar terms. One should possibly comment here that for the man in the street (read manager or decision maker) the word “analytics” has much more meaning than the term operations research – analytics is related to analysis but possibly analysis at a higher level! OR for that matter does not mean a thing for the man in the street.

**TS:** INFORMS gives the definition: the scientific process of transforming data into insight for making better decisions. This sounds almost like OR (but see next point as well). However, Mike Trick points out that many users of the term business analytics have in mind issues like data mining, text mining, etc., which seek to extract patterns and trends in information sources without formally looking at their incorporation into the decision making process. Some indeed, would seem to assume that if we extract the right data, good decision making will happen automatically. OR knows this is not true! So, I like the INFORMS definition, but I’m not sure that other users of the term would agree. In fact, as with most “buzz-words”, many users may prefer not to be tied down by formal definitions.

**In your opinion, what are some of the key similarities and differences between OR and analytics?**

**HI:** I think the article of Mike Trick preceding this interview shows the overlaps and differences between OR and analytics fairly well. For me what is important is the fact that it is clearly pointed out that OR is not Analytics, while Analytics is not OR – there are clear differences; for example, I just do not see OR people getting involved in analytics! At the same time the two can complement each other.

**TS:** By the INFORMS definition there is very little difference between OR and analytics. Perhaps I would argue that the link to “data” may be too limiting, depending how we define “data”. Some OR modelling that I have been involved in uses group workshops to construct a perception of the system under consideration. We experiment with the resulting models to get a qualitative sense of the effects of different interventions. Systems Dynamics approaches are a good example of this. (Do readers know Marjan van den Belt’s excellent book on “Mediated Modelling”?) Do we view such soft information as “data”? I suspect many users of “analytics” would not think so, and this would imply an important distinction. Personally, I do prefer to talk of information as a superset of data.

In common usage, analytics may mean extracting patterns from data, but without integration with softer information, and with little formal attention to how the resulting models will aid decision making. The primary focus of OR is in understanding the decision making process (objectives, constraints), and the concern with data is in supporting the decision models.

**Are there any points you would like to comment on, query, or add to the lists presented in the article by Michael Trick in terms of what analytics may learn from OR and vice versa?**

**HI:** I would add the following to what analytics can learn from OR:

1. A fairly well-structured problem solving approach;
2. Understanding the real problem and possibly assisting in formulating the problem better (i.e. don't just go and analyse data without a clear objective). In order to do this one has to ask the silly and stupid question since only then will one be able to really understand the issues; the problem that will ultimately assist in how to address the problem;
3. The ultimate aim and purpose of OR is to provide insight – it is not about the numbers and, importantly, the decision makers make the decisions!

What OR can learn from analytics?:

1. Managing and manipulating large sets of data.

**TS:** No, I like Mike's lists.

**Has there been any point in time that you can recall that there was ever as much hype around the phrase "Operations Research" as there has been currently surrounding the term "analytics"?**

**HI:** The OR fraternity has forever procrastinated over the use of the term Operations Research and this was especially evident in the sixties and seventies culminating in the two papers by Ackoff (1979) titled "The future of operational research is past" and "Resurrecting the future of operational research". Subsequently things have been fairly quiet and the focus was clearly on practicing OR and spreading OR into all spheres of life. This was achieved magnificently, I believe. Clearly there was still a feeling that the profession was not able to market itself properly and that it was not well known outside of OR circles. In the US there were two societies representing OR, which was confusing, and this prompted the establishment of INFORMS by combining the two societies TIMS and

ORSA. One of the major initiatives by INFORMS initially was to focus on the "branding" of OR which then led to "The Science of Better" initiative. There was also "Doing Good with Good OR" added to this initiative. All of this did not have the desired effect. EURO, representing the European OR societies, also started initiatives around "The Science of Better." When the term Analytics appeared on the horizon, INFORMS in particular, jumped at it. Now INFORMS wants to position itself (or OR) to be at the head of Analytics, while The OR Society (UK) wants to be at the heart of Analytics.

Going back to the name Operations Research – it is true that over the years groups or teams of Operations Researchers tended to call themselves names such as Decision Support Services (CSIR and I was the manager of the group at that stage!), Decision Sciences (UNISA), etc. Potential clients, or students, can relate to such names, and what they mean, much better than to the term Operations Research.

**TS:** Oh, undoubtedly. Around the time of the formation of ORSSA there were strong arguments for "operations analysis" rather than "operations research". I recall managers talking of "O&R", as they confused OR with "organization and methods (O&M)". There were heated debates over whether operations research and management science were the same (or perhaps with one incorporating the other, argued either way round!), or distinct. There have been similar debates around quantitative management and decision science. In areas like management, new fads emerge every decade, and the new converts preach the new gospel with great passion but little appreciation of what it is based on, or just a repackaging of, past approaches. The same is true for subsets of the discipline like constraint programming or 6-sigma quality management.

**From an ORSSA point of view, do you believe that it is necessary to adopt and incorporate analytics into the image and branding of the Society and if so, to what extent? Also, how would you propose the Society go about this?**

**HI:** ORSSA has had discussions in the past around changing its name. It did not go anywhere and I personally believe the same holds true in this case. Here I agree with Mike Trick; I have always and will for ever call myself an Operations Researcher and I will not change that, maybe I am from the old school. In addition, Operations Research overlaps with Analytics or Business Analytics – it cannot claim to be Analytics and vice versa. OR and Business Analytics complement



each other and there is a place for both of them. If ORSSA wants to add a secondary term to the name or use Analytics to describe better what OR can do, I would have no problem with that. However, I just don't think one should change the name of the society. If we can ride the wave then let's do it, but we certainly don't want to be stuck with a term in the name if it is going to disappear over time. Maybe it will be different this time, only time will tell though.

**TS:** While the fad is current, we must ride the wave. Tell the world that we are the true repository of good analytics, especially at the link with decision support. By all means integrate the word into our publicity (web page, conference) and milk it to the maximum. But "OR" should remain our branding, and when the next fad appears (around 2020, I'd guess), we'll be ready to milk that as well.

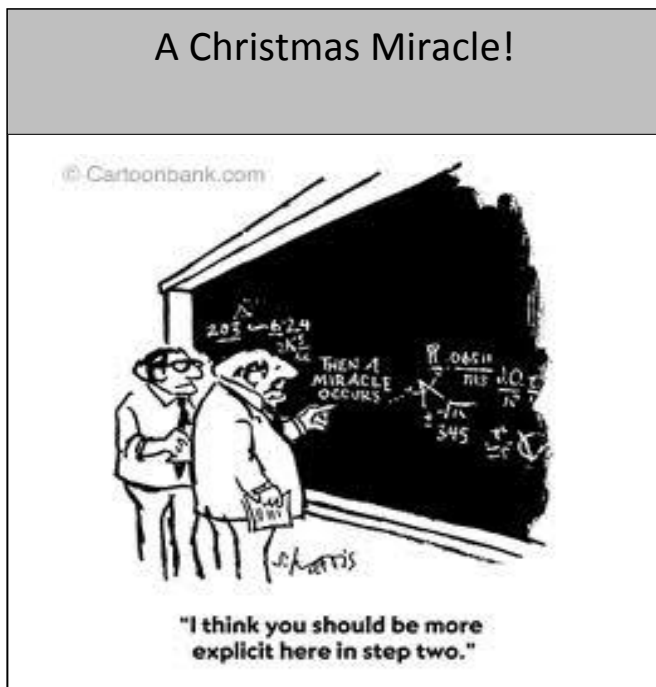
**Do you believe it is necessary for the science of Operations Research to continually re-invent itself to keep itself relevant, and if so, do you propose any other techniques besides re-branding?**

**HI:** I don't believe re-inventing is the correct term to use. As a science, Operations Research is constantly evolving with new techniques being developed, existing techniques being enhanced or adapted, in order to address different or more complex problems.

Let's be honest, our biggest problem is, and has been in the past – the name Operations Research – not for us practising it, but for those we have to convince to use our approach to problem solving. OR is very relevant, possibly more so than ever before and it is being applied all over. Why am I saying this? I get into contact, more and more, with people who are using techniques that we as OR traditionalists would consider OR techniques, but these people don't consider themselves to be Operations Researchers and they don't know that they are using OR to address their problems! Does this really matter? Is the fact that OR is used so wide-spread not more important and the real sign of success?

**TS:** I'm not sure what "re-invent" means. If you mean dumping all our current skills and experience for some new fads, that's crazy. Any field, OR included, must of course continue to develop and to evolve. Such development includes critical examination both of past approaches and practices, and of new proposals and trends. But the core concerns of OR to use critical, systemic, scientific thinking to support decision making in a complex environment must remain. I believe that we in OR have nothing to be ashamed of; the field

remains dynamic. I was recently at the INFORMS national meeting in Phoenix, Arizona, nearly 35 years after my first ORSA/TIMS meeting (as it then was). The range of topics was very different, the vocabulary had changed, but the same excited buzz remained.



**NOTICE**

From 2013 onwards medals will be introduced for both the 4<sup>th</sup> year / honours category and the masters category of the (written) ORSSA National Student Competitions. Names will be associated with these medals and ORSSA members are hereby invited to suggest names for these medals, by emailing the President, Jan van Vuuren, at [vuuren@sun.ac.za](mailto:vuuren@sun.ac.za). Emails should include your suggested medal names for each competition category as well as short motivations explaining why these names are, in your opinion, suitable.

**Closing date: January 31<sup>st</sup>, 2013.**

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## 2013 42<sup>nd</sup> ORSSA Annual Conference

**15-18 September 2013**

An advance warm welcome to the 42nd Annual Conference of the *Operations Research Society of South Africa* (ORSSA)! The Conference will be hosted by the Western Cape Chapter of ORSSA, and will be held at the Protea Hotel Technopark, just outside of Stellenbosch, from September 15th to 18th, 2013.

The conference will open with a welcome reception on Sunday evening September 15th and will close at lunchtime on Wednesday September 18th. Participation over the full spectrum of Operations Research is encouraged, including papers of a more fundamental nature, those on the application of Operations Research techniques in business and industry, about topical issues in Operations Research, and about the philosophy, teaching and marketing of Operations Research.

### Important Dates

<b>18 March</b>	Early bird registration & abstract/paper submission opens
<b>12 April</b>	Abstract submission closes for reviewed papers
<b>19 April</b>	Notification of acceptance of abstracts of reviewed papers and go-ahead to submit full papers for peer-review
<b>31 May</b>	Submission of full papers for inclusion in the conference proceedings closes
<b>5 July</b>	Early bird registration closes
<b>12 July</b>	Abstract submission closes for oral presentation of all papers
<b>22 July</b>	Notification of abstract acceptance for non-reviewed papers
<b>29 July</b>	Notification of acceptance of reviewed papers for proceedings
<b>1 August</b>	Cut-off for qualification of reduced room rates at the hotel
<b>26 August</b>	Registration closes

Delegates are responsible for their own travel and accommodation arrangements. The Protea Hotel Technopark is recommended, as the Society has arranged competitive rates for delegates. Travel directions to and reservation contact details of Protea Hotel Technopark may be found by visiting the ORSSA website at the address below.

Conference delegates have the option either to present non-peer reviewed papers at the conference (as we have become accustomed to in the past, and for which only an abstract submission is required), or to submit full papers for peer-review with the intention of having their papers published in conference proceedings, if accepted for publication.

Please visit the conference website for more  
information:

<http://conferences.sun.ac.za/index.php/orssa/>





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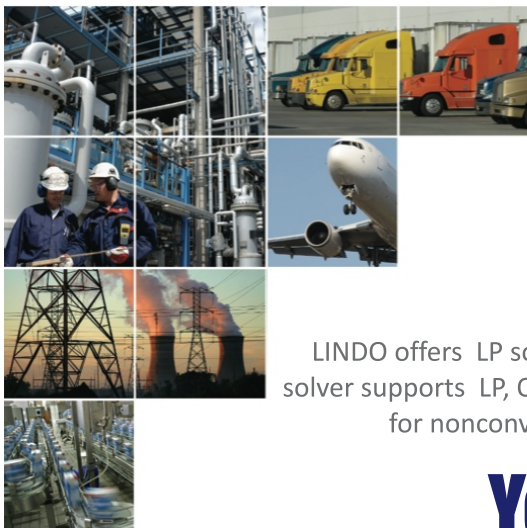
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